Levelogger®

Model 3001

The LT Levelogger has a datalogger, 10-year battery, pressure transducer and temperature sensor, all housed in a very small, minimal maintenance, 7/8" x 4.9" stainless steel housing.

The sealed design offers protection against power surges such as nearby pumps or lightning, and greatly simplifies maintenance.

Leveloggers can be inexpensively suspended on a simple wireline, or connected to the surface with direct read cable for rapid downloading of data and/or reprogramming, without removal from the water. Using a wireline reduces costs and allows the Leveloggers to be totally hidden from view and locked away from possible damage.

The10-year battery life, high accuracy and long-term stability make Leveloggers the ideal device for recording water levels in monitoring and production wells, boreholes, lakes, rivers, tanks, harbours, etc.

An inexpensive Barologger is available to provide the most accurate and easy method of barometric compensation. The Leveloggers themselves are available in a variety of ranges, as well as in a version that also measures dissolved oxygen and another that also measures conductivity.

The fully automatic, easily programmed Levelogger allows measurements at selected time intervals as small as 0.5 sec. with no wraparound, so that it does not overwrite data. Logarithmic and event-based sampling regimes are also easily programmed in the easy-to-use software.

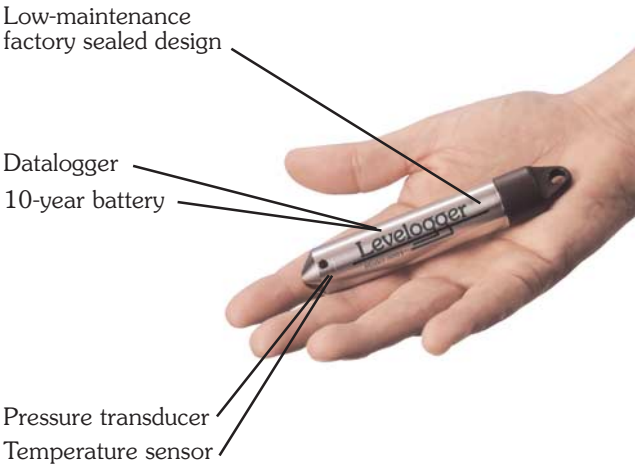
Applications

- Pumping and slug tests
- Watershed, drainage basin and recharge areas
- Stream gauging, lake levels and reservoirs
- Harbour and tidal fluctuation monitoring
- Wetlands and stormwater run-off monitoring
- Long term water level monitoring
- All intensive monitoring of groundwater levels

Leveloader

The Leveloader is an inexpensive, hand-held, data transporter that downloads field data from Leveloggers, without a laptop. It holds up to 190,000 sets of readings from up to 50 Leveloggers.

Simply hook up the Leveloader to the direct read cable and download; move on to the next well and then back to the office for transfer to the computer. No need for an expensive computer, hand-held PC or PDA. (See Leveloader Data Sheet.)



Accurate and Reliable

- 0.1% FS accuracy and long-term stability
- Small ranges available for increased accuracy
- Logarithmic, event-based or linear sampling
- Protected from power surges (pumps, lightning)
- Try out a rental

Easiest to Use

- No vented cable and no desiccants
- No need to continually replace batteries
- Maintenance-free, water-tight design
- The smallest logger of all 7/8" x 4.9" (22 x 125 mm)
- Lower price

Solinst Telemetry Systems (STS)

Telemetry systems are available for Leveloggers. The AMPs analog cellular transceiver provides wide-area, remote telemetry coverage, ideal for use in the USA and Canada. The digital GSM transceiver is suitable for urban areas and in many other places. It is smaller sized, suitable to fit inside 2-4" (50-100mm) wells.

Designed to allow self-management of the Levelogger data , the software is suitable for large or small systems. An STS can control up to 400 remote Leveloggers, Barologgers or Rain Gauges, with selectable automated reading schedules, as well as high and low level alarm options.
(See Data Sheet 9100)

Levelogger Operation

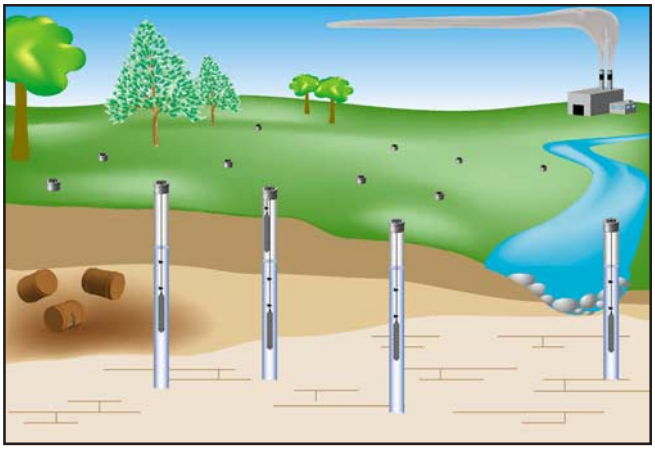
Programming of the Leveloggers requires one optical reader. Place the first Levelogger into a reader attached to a desktop or portable computer. Then fill out the various fields in the program screen with site information and choice of sampling regime.

The Leveloggers can then be started immediately, or with a future start time. They can be pre-programmed and taken to the site at a later time. If future start is chosen, no memory is used until start time. If immediate start is chosen the operator can see the loggers working before deploying them.

A manual measurement of the initial depth to water is taken in each well, and noted as a base line measurement. When a Barologger is used for barometric pressure measurements, it is set above high water level in one location on site.

If direct read cables are being used, data can be viewed and retrieved from the Levelogger at anytime. Use the handy Leveloader or a portable computer.

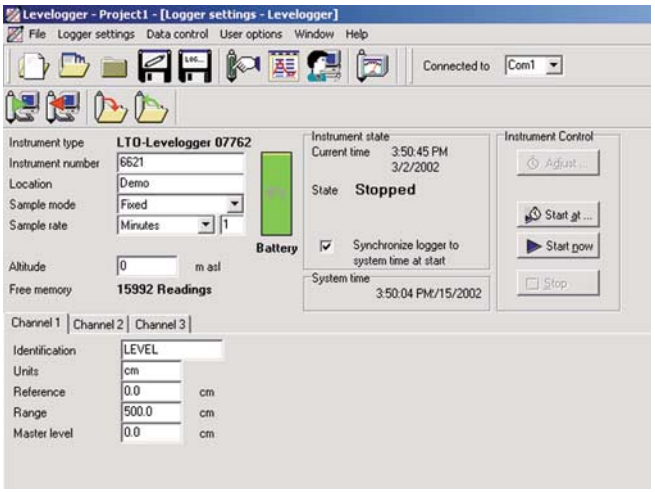
To download data from a Levelogger suspended on wireline, simply remove it from the well and place it in an optical reader attached to a Leveloader in the field, or to a computer in the field or back in the office. Data that has been collected is retained in the Levelogger until the Levelogger has been restarted.



Software

Leveloggers are programmed using a desktop or portable computer and an optical reader. The Windows software is very easy to use. Setup and programming are very fast and simple, using the screen shown below.

The measurement time interval can be set between 0.5 secs. and 99 hours in linear sampling mode, set to a choice of short, medium or long logarithmic options or to event-based options. There is ample space for entering site, customer and sampling information.



Easy Programming in One Window

Leveloggers may be synchronized to the computer clock, and there are options for immediate start or a future start time. The battery has an estimated life of 10 years and the percentage life remaining is indicated on the programming screen.

The data downloaded from a Levelogger has already been automatically temperature-compensated. If the altitude of the logger has been entered into the altitude field, it will also have been adjusted for altitude. When a Barologger and the Windows software is used, barometric compensation is highly accurate and problem free. The Barometric Compensation Wizard can be used prior to export of the data to other programs.

The software allows immediate viewing of the data in graph or chart form, or simple downloading for future examination. It also allows easy export into a spreadsheet or database for further processing.

The software can be used with any type of Levelogger including previous versions of the Levelogger.

Use of Direct Read Cables

When it is desired to get real-time data and communicate with Leveloggers without removal from the water, they can be deployed using direct read cables.

The lower end of the direct read cable has a miniaturized infra-red optical reader. The top cap of the Levelogger is removed and the direct read cable is attached in its place. In turn the upper end of the cable attaches, via a PC Interface Cable, to the portable computer.

This allows viewing of the data, downloading and/or programming in the field.

The full benefits of a sealed Levelogger with no vent tube or electrical cable connection are also maintained. The logger is still sealed from all electrical interference through a Faraday cage effect and cable handling problems are minimized.

Use of Wireline Suspension

Leveloggers may also be suspended in the water on wireline. This is a very inexpensive method of deployment, and if in a well, allows them to be locked out of sight and inaccessible to anyone with a special key.

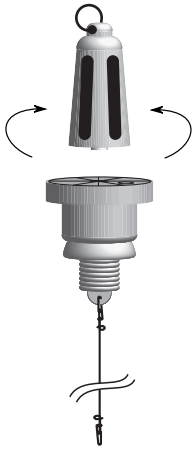
Solinst has adapted the Enviro Cap™ by putting a vent hole in the cap to allow for the equalization of barometric pressure. The well cap has a convenient eyelet from which to suspend the Levelogger. It slips over the casing and is locked in place with the special key, as shown.

The Enviro Caps are available sized for 2" and 4" wells, and well caps for other sizes of well can also be used.

Levelogger, 30 ft. (9m) of Direct Read Cable and Integral 1" Well Cap and Cover.

PC Interface Cable 2" Wellcap and Cover.

The PC Interface Cable connected to the Direct Read Cable.



Lockable Cap with Key, Wireline and Hooks.

Direct Read Cable Specifications

Direct read cables are available for attachment to any Levelogger, new or old, in standard lengths of:

50', 100', 200', 300' 500' and 15m, 30m, 60m, 80m 100m

Custom cable lengths up to 1640 ft. (500m) are also available, to fit particular monitoring situations, as required. Cable markings, each 5 ft. or one meter, may be requested, for situations where the direct read Leveloggers need to be used in a variety of locations.

The 1/10" dia. (2.54 mm) cable has an HDPE outer jacket for strength and durability. The stranded stainless steel central conductor gives non-stretch accuracy.

The upper end of the direct read cable is fitted with a connector that can act as a well cap for a 1" well. This connector fits into Solinst Levelogger well caps designed for 2" or 4" wells, and can easily be attached at surface in other situations.

Accurate Barometric Compensation

Leveloggers measure absolute pressure (water pressure + atmospheric pressure) expressed in feet or centimeters of water column.

The most accurate method of obtaining changes in water level is to compensate for atmospheric pressure using a Barologger. This avoids any time lag in the compensation figures and any errors introduced due to moisture buildup, kinking or damage to vented cable. It can also be very useful to have recorded barometric information to help determine barometric lag and/or any damping effect from the surface to the monitored aquifer.

The Barometric Compensation Wizard in the Levelogger Windows software simplifies the adjustment of the level measurements for barometric pressure changes, by using the synchronized data from all Leveloggers on site and the site Barologger.

The overall results give more reliable, highly accurate level data than that obtained when using high maintenance and expensive vented cable.

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General Levelogger Specifications

Wetted Materials: 316-L stainless steel, ceramics, Akulon and Viton

Battery Life: 10 years

Clock Accuracy: Better than 1 second/day @ 20°C correctable at each communication

Operating Temperature: -20°C to 80°C

Communication: RS232 (Optical Infra-Red)

LT & Barologger Dimensions: 7/8" x 4.9" (22 mm x 125 mm)

LT & Barologger Weight: 5.7 oz (160 g)

CE

Specifications	LT Levelogger	Barologger
Models	F15, F30, F60, F100, F300 M5, M10, M20, M30, M100	F5/M1.5
Memory	Non-volatile, Flash	Non-volatile, Flash
Max. # Readings	2 x 24,000 Linear, Event or Log	2 x 24,000 Linear, Event or Log
Measurement Rates	Linear at each 0.5 sec to 99 hrs, Event- Based, or 25.8 hr, 157.5 hr, 297 day Logarithmic	Linear at each 0.5 sec to 99 hrs, Event- Based, or 25.8 hr, 157.5 hr, 297 day Logarithmic
Level Sensor	**Ceramic Transducer**	**Ceramic Transducer**
Normalization	Automatic Temp Compensation (to 1%FS from -10°C to 40°C)	Automatic Temp Compensation (to 1%FS from -10°C to 40°C)
Accuracy	0.1% FS (-10°C to 40°C)	0.3% FS (-10°C to 40°C)
Water Level Fluctuation Range (at Sea Level)	F15/M5 = 13.12 ft/4m F30/M10 = 29.52 ft/9m F65/M20 = 62.32 ft/19m F100/M30 = 95.14 ft/29m F300/M100 = 324.8 ft/99m	5 ft/1.5m
Resolution	F15/M5 = 0.003 ft/0.1 cm F30/M10 = 0.007 ft/0.2 cm F65/M20 = 0.01 ft/0.4 cm F100/M30 = 0.02 ft/0.6 cm F300/M100 = 0.07 ft/2 cm	
Temperature Sensor	**Spreading Resistance Silicon**	**Spreading Resistance Silicon**
Range	-20°C to 80°C	-20°C to 80°C
Accuracy	0.1°C	0.1°C
Resolution	0.01°C	0.01°C

Dissolved Oxygen Levelogger: See Model 3001 LTDO Data Sheet for details

Conductivity Levelogger: See Model 3001 LTC Data Sheet for details

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